Pollution Prevention Fact Sheet
Commercial Solvent Recycling
Utah Department of Environmental Quality
Promoting a Healthy Environment

Introduction

Companies that generate solvent waste understand that the most cost effective and environmentally acceptable method of managing spent solvent is by not generating it in the first place. Source reduction techniques or minimizing the generation of spent solvent at the source as well as pollution prevention (P2) where toxic solvents are replaced with new non-toxic solvents should be investigated before examining the feasibility of recycling the commonly used toxic solvents found in many businesses today. This fact sheet will only address issues concerning the commercial recycling of toxic solvents due to their potential threat to human health and the environment.

Companies must consider many issues before pursuing solvent recycling as a waste management option. While some companies have chosen to install in-house solvent distillation units to recycle their own spent solvent, others have enlisted the services of a commercial solvent recycling company.

In-house solvent distillation units minimize transportation, disposal and potential liability costs associated with off-site disposal. Sometimes, however, in-house recycling is not cost effective or consistent with existing facilities and labor skills, or it fails to produce solvent that can be reused by the facility. In these instances, a commercial solvent recycling service may be preferred.

Types of Services Offered

Most commercial solvent recyclers accept and recycle spent solvent at a central location. However, a few companies operate mobile units and perform on-site solvent recycling. The mobile units can recycle the same types and quantities of solvents as centralized recyclers, but customers bear the responsibility for disposing of the residuals. Generally, companies pursue one of three arrangements for recycling spent solvent off-site:

1. Toll recycling,
2. Speculative recycling or
3. Using waste brokers.

Using waste brokers may not be a true recycling arrangement, because even though they sometimes sell spent solvent to solvent recyclers, they usually sell it as a waste-derived fuel for cement kilns and industrial furnaces.

Toll Recycling:
Toll recycling offers companies an opportunity to have their spent solvents recycled and then returned to them. Toll recyclers typically recycle only large batches (2,000 to 5,000 gallons) of solvent, as distillation or other recycling technologies are impractical for small quantities. However, some toll recyclers may accept small quantities (as little as five gallons), which can be combined with small quantities received by others until they have adequate quantities for batch recycling. Frequently, toll recyclers offer a solvent management package including: supplying and maintaining solvent wash equipment, pumping spent solvent from cleaning tanks, replenishing the tanks with fresh solvent, hauling both the spent and replacement solvents to and from the recycling site and recycling the waste solvent. During the solvent recycling process, contaminants such as water, oil, dirt and paint residues--called still bottoms--are separated from the clean solvent. Because of their high BTU content, still bottoms are often processed into a fuel and burned for energy recovery in cement kilns.

Speculative Recycling:
Companies that wish to dispose of spent solvent without receiving recycled solvent in return may opt for speculative recycling. Speculative recyclers commingle similar solvents from many generators, recycle the spent solvents and sell the product in the market place as a recycled solvent. Fees charged for speculative recycling reflect the market value of the solvents to be recycled. In some cases where the solvent has high market value, such as chlorinated solvents, the reclaimer will pay the generator for it.

Considerations When Selecting a Recycler

Screening Potential Services: Evaluation of recycling as a waste management option proceeds in stages. Initial evaluation tends to center on logistics and economic feasibility.

When determining whether to explore commercial solvent recycling, first identify solvent recyclers that service a geographic area. The National Association of Chemical Recyclers maintains a list of solvent recyclers, including mobile units as well as a listing of its members, some of which handle not only solvents but other chemicals. Solvent recyclers frequently handle only certain types of solvents and usually stipulate minimum quantities accepted.

Prior to processing, solvent recyclers will test spent solvent to determine its composition. Most solvents used today are blends of different solvents of the same family. In addition to identifying solvent recyclers, determine the availability of registered haulers to transport the spent solvent. Many solvent recyclers offer transportation services to their customers. Alternatively, consider waste brokers or third-party transportation services. Mobile recycling services eliminate the need to transport solvent. However, the company generating the spent solvent will be responsible for the transportation and disposal of the still bottoms.

When evaluating the logistics of off-site solvent recycling, analyze the economic feasibility of using each available commercial recycling service. When conducting an economic analysis, consider the following factors:

1. Quality of recycled solvent. The tighter the specification for the recycled solvent, the

higher the processing costs.

2. Quality of spent solvent. Segregate solvents and keep water out to improve recyclability of the spent solvent, and reduce the processing costs.
3. Quantities. Increasing the batch size of spent solvent lowers unit processing costs.
4. Higher recovery or yield of clean solvent is achieved from economy of scale. The set up costs for processing 100 gallons of spent solvent is the same as for processing 1,000 gallons. Larger batch sizes also reduce unit transportation costs.
5. Disposal costs of the still bottoms or unrecovered portion of the waste stream.
6. Transportation costs.
7. Type of solvent. Most chlorinated solvents have higher resale value.

Types of Recyclable Solvents

Petroleum Distillates	*Oxygenated Solvents*	*Halogenated Solvents*
Aliphatics	Acetone	Chlorinated Solvents
Heptane	Methyl Ethyl Ketone	Methylene Chloride
Stoddard Solvent	Methyl Isobutyl Ketone	Perchloroethylene
Mineral Spirits	Esters	Trichloroethylene
Aromatics	Ethyl Acetate	1,1,1 Trichloroethane
Toluene	Butyl Acetate	Fluorinated Solvents
Xylene	Alcohols	1,1,2 Trichlorotrifluoroethane
	Butyl Methyl	
	Isopropyl	

Solvent Quality

Solvent quality requirements greatly affect the cost of solvent recycling. It is wise to become familiar with solvent quality requirements.

Although all solvent that has been recycled bears the label "recycled solvent," the quality of recycled solvent may vary significantly. The solvent quality determination will depend on the type of solvent under consideration. For recycled non-chlorinated solvents, quality simply refers to solvent purity, i.e., the relative quantities of contaminants the solvent contains. To determine quality, examine the identities and amounts of constituents in the recycled solvent. For example, recycled acetone may actually contain 95% acetone, 3% water and 2% various other solvents. Some recyclers can adjust the quality of recycled solvents produced by removing specific contaminants in addition to suspended solids. Others only possess the ability to remove solids. When conducting research, pinpoint the recycler's ability to adjust solvent quality to meet your needs. Determining quality for chlorinated solvents requires evaluating inhibitors and metal stabilizers. Acid inhibitors neutralize acids formed in the solvent, while metal stabilizers prevent the solvent from corroding the metal it comes in contact with. A recycled chlorinated solvent can be classified as either:

1. A simple recycled solvent to which no inhibitors or stabilizers have been added,
2. A recycled solvent to which acid inhibitors have been added or
3. A recycled solvent that recyclers have restabilized with acid inhibitors and metal stabilizers.

When accepting recycled solvent, know the quality of solvent being accepted. Set standards and

communicate these to recyclers, as contaminated or improperly stabilized solvents can produce problems. Obtain an analysis of the recycled solvents, and make certain that those received possess the minimum purity negotiated. The best solvent recyclers analyze their products and will provide data showing contaminant and stabilizer content of their product.

Final Considerations

Once a commercial recycler capable of providing the services needed at an acceptable price is identified, final consideration should focus on the recycler's regulatory compliance status.

The federal Resource Conservation and Recovery Act of 1976 (RCRA) charges generators of hazardous wastes with "cradle to grave" responsibility for the hazardous waste they produce. Most spent solvents qualify as hazardous waste because they are flammable and/or toxic. Solvent waste generators must comply with federal and state regulations governing the management and shipment of spent solvent to off-site recyclers. Solvent waste generators may also be liable for damages resulting from mishandling spent solvent. Therefore, learn whether the recyclers being considered are complying with RCRA. Before selecting a recycler, conduct an inspection of the facility to ensure that compliance with regulations is being taken seriously. In particular, pay attention to the following:

- Manifesting and reporting requirements
- Permits held by recycling facilities
- Record-keeping practices
- Liability insurance
- Disposal procedures used by recycling facilities for still bottoms
- Proof of regulatory compliance
- Environmental monitoring practices of recyclers.

Finally, evaluate the expertise and reputation of solvent recyclers being considered. Do they have their product analyzed? How well do they understand solvent purity requirements prescribed by products and processes?

Most reputable reclaimers can provide testimonials on the services received. Also, speak with other customers. Relying on reputable experts allows for reliable service and helps avoid potential liability problems. Consider similar evaluations of transporters as well.

For More Information, Contact:
Division of Solid & Hazardous Waste- (801) 538-6170.
Environmental Hotline (800) 458-0145
Pollution Prevention Coordinator (801) 536-4477

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